UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/874,395	06/04/2001	James W. Jones	CLX021 US	4480

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EXAMINER
MERED, HABTE

ART UNIT	PAPER NUMBER
2662	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	**Applicant(s)**
Office Action Summary	09/874,395	JAMES W JONES
	Examiner	**Art Unit**	
	Habte Mered	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-11_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-11_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _04 October 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _03-15-2005_.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   **Claims 1, 3, 5, 6, and 8-11** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Parrella et al (US 6, 205, 155), hereinafter referred to as

Parrella, in view of Miller et al (US 6,622,182), hereinafter referred to as Miller.

Parrella discloses an arbitration apparatus with backpressure capability.

Parrella's apparatus provides backpressure capability using a flow control entity

to monitor the capacity of a buffer and informs the arbiter if a grant signal will

cause a buffer overrun. (See Column 2, Lines 66-67 and Column 3, Lines 1-

10)

Regarding **claims 1 and 6**, Parrella discloses a method of regulating the

rate of packet grants in an asynchronous cross-point switch **(See Figure 1 – an**

arbiter system used in an ATM switch is shown. The bus master (element

10 in Figure 1) is the arbiter (switch controller). See Column 3, Lines 28-40

and 60-65; Column 4, Lines 13-17. Elements 32a and 32b are the counters

used by the arbiter to track the cells destined for an output buffer. See

Column 5, Lines 8-20), the method comprising ~:

instructing the arbiter to cease issuing grants for packets having the output as a

destination once the counter has exceeded a predetermined threshold **(See**

Column 5, Lines 40-55 and Column 6, Lines 1-9 and steps 120, 125 ad 130

in Figure 3).

Parrella however, fails to disclose incrementing a counter for every packet

grant issued by an arbiter to a traffic source to release a packet having a

particular output for a destination; decrementing the counter each time a packet

stored in a buffer is read out from the buffer.

Miller discloses a method and apparatus for controlling the flow of

information to an input/output unit within a computer-controlled system. The

apparatus is shown in Figure 2. In Miller's system the traffic source is network

processor 201 and uses buffer FIFO 201a for storage. Memory Controller 205 is

effectively the arbiter. The arbiter (i.e. memory controller 205) regulates the data

flow between the network processor 201 and the input /output unit 230 attached

to cross bar switch 220. The arbiter (i.e. memory controller 205) contains

mechanisms for controlling input/output data flow downstream to the input/output

unit 230 from processor 201 (i.e. traffic source) by maintaining an accounting of

the buffer space vacancies within input/output unit 230. The mechanisms for

controlling input/output data flow include a counter for keeping a running count of

the space available in the FIFO buffer 230a in input/output unit 230. (See

Column 5, Lines 1-35). If the arbiter in Miller's system determines that data

congestion is going to occur at the input/output unit 230 then it signals processor

201 to suspend transmission. (See Column 6, Lines 37-42)

Miller discloses incrementing a counter for every packet grant issued by an

arbiter to a traffic source to release a packet having a particular output for a

destination; decrementing the counter each time a packet stored in a buffer is

read out from the buffer. **(Please refer to Figure 2. In Miller's system the**

traffic source is processor 201 and has FIFO buffer 201a. The memory

controller serves as the arbiter for data flow from the processor's FIFO

buffer 201a to the FIFO buffer 230a in the input/output unit 230. See

Column 5, Lines 24-30.

In Figure 4, the memory controller is shown in detail and has a credit

counter unit. The credit counter unit 315 is initialized with a value that

reflects the initial available buffer space in the input/output unit 230 as also

shown in step 415 of Figure 5. See Column 7, Lines 35-40. Processor 201

on a real time basis knows the value of the credit counter. See Column 7,

Lines 25-27. That means the traffic source knows how much information

can be sent to the destination without overflowing buffer 230a of the

destination.

Therefore, using the terminology of the applicant a grant must first

occur in order for a packet to initially leave the source buffer and finally

reach the destination input/output buffer. Hence when a packet leaves the

traffic source FIFO buffer 201a it is equivalent to the applicant's

terminology of a packet grant. In fact, the applicant uses the limitation

"issuing a packet grant" in claim 1 at the same level with the limitation

"storing a packet in the destination buffer" in that both limitations cause an

increment in the counter. This further confirms the examiner's position that issuing a packet grant is interchangeable with the packet leaving the traffic source buffer 201a and is further interchangeable with storing the packet in the destination input/output buffer.

Miller discloses that in a preferred embodiment, the credit counter 315 is decremented when a packet grant occurs (i.e. a data store or information packet leaves the FIFO buffer 201a) and is incremented when a packet is removed from the destination input/output buffer. Miller also discloses an inverse counter maintenance mechanism in line with that of the applicant where the credit counter 315 is incremented when a packet grant occurs (i.e. a data store or information packet leaves the FIFO buffer 201a) and decremented when a packet is removed from the destination input/output buffer. See Column 7, Lines 20-35.

Note that the traffic source does not need a special grant signal from the arbiter because it can readily see the value of the credit counter 315 which is a running count of the space available in the destination output FIFO buffer 230a. As long as the value of the credit counter 315 is not zero data will be sent from the source to the destination buffer. See Column 7, Lines 40-55. The input/output unit 230 sends an indication to the arbiter (i.e. memory controller) when a data store leaves FIFO buffer 230a and consequently the credit counter 315 is decremented indicating available space in the destination buffer or credit in the form of grant to the traffic source.)

It would have been obvious to one having ordinary skill in the art at the

time the invention was made to modify Parella's method by incorporating a flow

control method where the rate of grant or credit issuing is based on the available

space in the destination buffer, the motivation being an efficient utilization of the

buffer space at the destination by preventing buffer overflow and limiting

unnecessary interrupts to the flow control mechanism.

3.   Regarding **Claims 3 and 8**, the modified invention of Parrella and Miller as

taught above disclosed the aforementioned invention including the method

wherein: the predetermined threshold is programmable by writing to a

predetermined register. **(It is inherent to any system that wants to store a**

predetermined threshold for performing comparisons will have to store it

and the best choice is a register when access speed and cost is taken into

consideration. Thresholds used in both Parrella's and Miller's systems

have to be predetermined and have to take into account the size of the

destination buffer. Since the function of a register is to store data that is

frequently accessed and since the data in a register can be re-written any

transaction on a register can be considered programmable. The applicant

use of register confirms the inherency discussed.)

4.   Regarding **Claim 5**, the modified invention of Parrella and Miller as taught

above disclosed the aforementioned invention including the method further

comprising: each time the counter is decremented, decrementing an additional

counter; incrementing the additional counter for every packet stored into the

buffer; and instructing-the arbiter to cease issuing grants for packets having the

buffer as a destination once the additional counter has exceeded an additional

predetermined threshold. **(This claim is identical to claim 1 but has an**

additional second counter that does the same thing as the first counter.

The modified invention of Parrella and Miller as taught above disclosed the

aforementioned invention with respect to the first counter. There is no

value added in using a second counter to count the same variable. The

support cited by applicant for this claim to be specific is page 8, lines 1-2

and page 9, lines 16-17. However these citations do not support a

secondary counter. In fact, the applicant's specification and diagrams only

show a grant counter in the output buffers.)

5.   Regarding **Claim 9**, the modified invention of Parrella and Miller as taught

above disclosed the aforementioned invention including a method wherein the

buffer is at an output of the cross-point switch. **(See Miller's Figure 2. Element**

230a is a buffer at an output of a cross-point switch. See Miller's Column 5,

Lines 48-67;)

6.   Regarding **Claim 10,** the modified invention of Parrella and Miller as

taught above disclosed the aforementioned invention including a method wherein

the buffer is at an input of the cross-point switch. **(See Miller's Figure 2.**

Element 201a is a buffer at an input of a cross-point switch. See Miller's

Column 5, Lines 48-67;)

7.   Regarding **Claim 11**, the modified invention of Parrella and Miller as

taught above disclosed the aforementioned invention including a method wherein

the buffer is at an output of the cross-point switch; the buffer is at an input of the

cross-point switch; and the method further comprises performing incrementing,

decrementing and instructing with another buffer at an output of the cross-point

switch. **(See Miller's Figures 2 and 4; Column 7, Lines 23-40)**

8.   **Claims 2 and 7** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Parrella et al (US 6, 205, 155), hereinafter referred to as

Parrella, in view of Miller et al (US 6,622,182), hereinafter referred to as Miller as

applied to claim 1 above, and further in view of Assa et al (US Pub. No.

2002/0018474), hereinafter referred to as Assa.

9.   Regarding **claims 2 and 7**, the modified invention of Parrella and Miller as

taught above disclosed the aforementioned invention but does not disclose a

method further comprising: negating the instruction to the arbiter to cease issuing

grants, based at least on a hysteresis setting, thereby to start issuing grants

again after the instructing.

Assa discloses a buffering technique where the basic principle of the

method is to ensure that while accepting input data, the buffer has enough

available capacity to store complete frames and conversely, as long as the

buffer's available capacity falls short of such condition, all incoming data is

discarded. Assa accomplishes the buffering technique that allows him to store

complete frames using hysteresis settings. (See Paragraphs 17 and 19)

Assa discloses a method further comprising: negating the instruction to the

arbiter to cease issuing grants, based at least on a hysteresis setting, thereby to

start issuing grants again after the instructing. **(See Paragraphs 17, 19, 41 and**

Figures 5-7)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the modified invention of Parrella and Miller by incorporating a hysteresis setting, the motivation being able to store in the buffer a complete frame and consequently guaranteeing a high throughput of complete packets.

10.   **Claims 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella et al (US 6, 205, 155), hereinafter referred to as Parrella, in view of Miller et al (US 6,622,182), hereinafter referred to as Miller as applied to claim 1 above, and further in view of Barkey et al (US 5, 825, 748), hereinafter referred to as Barkey.

11.   Regarding **claim 4**, the modified invention of Parrella and Miller as taught above disclosed the aforementioned invention but does not disclose the method of further comprising: periodically auditing the counter to avoid upward drift due to loss of packets.

Barkey discloses a credit-based flow control-checking scheme between a sender entity and a receiver entity. The sender and receiver entities can be in a switch environment as shown in Figure 1. Each credit represents permission to transmit one data segment over the data link to the receiver and is in effect a packet grant. (See Column 2, Lines 6-7). In Barkey's system the receiver has dual functionality in that it acts as an arbiter by issuing credits (i.e. grants) (See Column 1, Lines 40-41) and plays the role of destination by receiving the packets or cells issued from the source as a result of getting the credits issued by the receiver. The source interprets credits as an indication of the amount of data

it can transmit into the receiver in the network. (See Column 1, Lines 49-51;

Column 2, Lines 57-67; and Column 3, Lines 1-7)

Barkey discloses the method of further comprising: periodically auditing

the counter to avoid upward drift due to loss of packets. **(Barkey discloses an**

elaborate system of a credit checking system where the grant or credits

counter gets audited for loss of packets. Figure 4 depicts one embodiment

of sender credit checking while Figure 5 shows one embodiment of

receiver credit checking. The counters being audited are shown in Figure

1. See Column 7, Lines 1-17; Column 8, Lines 59-67)

It would have been obvious to one having ordinary skill in the art at the

time the invention was made to modify the modified invention of Parrella and

Miller by incorporating credits counter audit, the motivation being able to

ascertain whether credit loss or credit gain has occurred from a specified number

of credits and to be able to automatically correct an ascertained credit loss or

credit gain without resetting the system.

Conclusion

12.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

The following patent is cited to show the state of the art with respect to an

arbiter using backpressure signaling:

US Patent (5, 892, 766) to Wick et al

The following US Patent Application Publications are cited to show the

state of the art with respect to credit based flow control mechanism:

US Pub No. (2002/0176429) to Calvignac et al

US Pub No. (2002/0191642) to Calvignac et al

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571 272 3088. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HM
05-05-2005

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